

UNCLASSIFIED

PROBLEMS OF STATISTICAL INFERENCE AND OPTIMIZATION  
FEB 07 J S MUSTAGI NO

FEB 07 J S RUSTAGI

OSURT-12

FIG 12/1  
ION WITH APPLICA--ETC (W)  
N00014-78-C-0543

N00014-78-C-0543

NI

10-1  
1008

END  
DATE  
FILMED  
11 82  
D-4

RF Project 761219/711308  
Final Report

the  
~~ohio~~  
state  
university

research foundation

1314 kinneer road  
columbus, ohio  
43212

PROBLEMS OF STATISTICAL INFERENCE  
AND  
OPTIMIZATION WITH APPLICATIONS

J. S. Rustagi  
Department of Statistics

For the Period  
July 1, 1978 - September 30, 1981

DEPARTMENT OF THE NAVY  
Office of Naval Research  
Arlington, Virginia 22217

Contract No. N00014-78-C-0543

DTIC  
ELECTE  
OCT 5 1982  
S H D

DISTRIBUTION STATEMENT A  
Approved for public release  
Distribution Unlimited

February 8, 1982

the Ruth H. Hooker Technical Library

FEB 19 1982

Naval Research Laboratory

02 10 04 1982

AD A120151

FILE COPY

FINAL REPORT

PROBLEMS OF STATISTICAL INFERENCE  
AND  
OPTIMIZATION WITH APPLICATIONS

J. S. Rustagi  
Department of Statistics  
The Ohio State University

Submitted to  
Office of Naval Research

Research supported by Contract No. N 000-14-78-C-0543 (NR 042-403).

DISTRIBUTION STATEMENT A  
Approved for public release;  
Distribution Unlimited

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 12	2. GOVT ACCESSION NO. AD-A120151	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Problems of Statistical Inference and Optimization with Applications		5. TYPE OF REPORT & PERIOD COVERED Final - 7/1/78-9/30/81
7. AUTHOR(s) J. S. Rustagi		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Statistics Ohio State University 1958 Neil Avenue, Columbus, Ohio 43210		8. CONTRACT OR GRANT NUMBER(s) N00014-78-C-0543
11. CONTROLLING OFFICE NAME AND ADDRESS Office of Naval Research Department of Navy Arlington, Virginia 22207		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR 042-403
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE February, 1982
		13. NUMBER OF PAGES 4
		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Final report		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  A brief account of the activities on the project is described. A list of all the publications on this project is also given.		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 68 IS OBSOLETE  
S/N 0102-LF-014-6601

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

## 1. Introduction

With the support of Office of Naval Research was initiated in the areas of regression models for grouped data and optimization techniques in statistics. The results obtained were communicated through interim technical reports and publications in journals. The list of such publications is given. ←

## 2. Publications on the Project

1. Indrayan, A. and Rustagi, J. S. (1979). Approximation Maximum Likelihood Estimates in Regression Models for Grouped Data, Optimizing Methods in Statistics, (Editor, J. S. Rustagi), Academic Press, New York, pp. 301-309.
2. Rustagi, J. S. (1979). Recent Applications of Variational Techniques in Statistics, Technical Report No. 186, Department of Statistics, The Ohio State University, pp. 1-14.
3. Rustagi, J. S. and Yang, Joanne (1979). Estimation of Rate Constants in Michaelis-Menten Model, Technical Report No. 177, Department of Statistics, The Ohio State University.
4. Indrayan, A. and Rustagi, J. S. (1981). Approximate Tests of Hypotheses in Regression Models for Grouped Data, Commun. Statist. - Simula. Computa., B10 (4), pp. 327-341.
5. Rustagi, J. S. (1980). Statistical Considerations in Control Models with Applications, Technical Report No. 211, Department of Statistics, The Ohio State University, pp. 1-35.
6. Some Tests of Randomness with Application, Technical Report No. 222, Department of Statistics, The Ohio State University, pp. 1-35, (1981).
7. Rustagi, J. S. (1981). Probabilistic Structures of Modern Lottery Games, Technical Report No. 236, Department of Statistics, The Ohio State University, pp. 1-35.
8. Rustagi, J. S. (1982). Optimizing Techniques in Simulation, Digital Simulation Tools Handbook, (Editor, A. N. Silver), McGraw-Hill Book Company, New York, (To appear). Technical Report No. 239, Department of Statistics, The Ohio State University.
9. Rustagi, J. S. and Zanakos S. (Editors) (1982). Optimization in Statistics, TMS Advanced Studies in Management Sciences, (To appear).
10. Rustagi, J. S., Tech, N. and Yousry, M. (1981). Bibliography of Recent Literature on Optimizing Methods in Statistics, Technical Report No. 240, Department of Statistics, The Ohio State University.

11. Rustagi, J. S. (1981). Introduction to Optimization in Statistics, Technical Report No. 249, Department of Statistics, The Ohio State University.
12. Berliner, L. Mark (1981). Uniform Improvements on the Certainty Equivalent Rule in a Statistical Control Problem, Technical Report No. 237, Department of Statistics, The Ohio State University, pp. 1-12.

### 3. Impact of the Work on Science and Navy

We describe here briefly the impact various aspects of the research have made on the scientific community and the Navy.

(i) In recognition of the importance of Optimization in Statistics, The Institute of Management Sciences and Operations Research Society are publishing a volume of invited and contributed papers on Optimization in Statistics with special applications in management sciences. The volume is prepared under the editorship of J. S. Rustagi and Stelios Zanakis of Florida International University.

(ii) J. S. Rustagi was invited by the editor of Digital Simulation Tools Handbook, to be published by McGraw-Hill Book Company to write a chapter on Optimizing Techniques in Simulation under the editorship of Dr. A. Silver.

(iii) Dr. Robert E. Machol of Office of Naval Research, London office brought to our attention a problem of a Czechoslovakian economist, Jan Klacek, who was interested in some aspects of an optimization problem. A satisfactory resolution of the problem was made.

(iv) Contact was made by a naval scientist, Dr. Derrill J. Bordelon from U.S. Naval Underwater Systems Center, Newport, Rhode Island, regarding Fisher Information when parameter is random.



<input checked="checked" type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
Distribution/	
Availability Codes	
and/or	
Special	
A	

From the above contacts, it seems that the work has found some applications in the Navy and the scientific community.

4. Other Related Publications and Activities

- (i) J. S. Rustagi spent the Summer, 80 at Stanford University, Department of Statistics as a visiting scholar.
- (ii) In October, 80, a Conference on Teaching of Statistics and Statistical Consulting was organized at The Ohio State University jointly by J. S. Rustagi and D. A. Wolfe. The proceedings are published by Academic Press under their editorship to appear in April, 1982.
- (iii) Scientific meetings attended were:
  - IMS annual meetings at Vail, Colorado, 1981,
  - IMS meeting at Davis, California, 1980 and
  - ASA annual meeting at Washington, 1979.
- (iv) J. S. Rustagi was invited speaker at the Canadian Conference on Applied Statistics, Montreal, April, 1981 and lectured at the Indian Statistical Institute and Institute of Agricultural Statistics in July, 1979.
- (v) J. S. Rustagi was director of the IMS-ONR Advanced Lecture Series on Variance Components, g-Inverses and Applications given by Prof. C. R. Rao, July, 1979.
- (vi) J. S. Rustagi participated in U.S.-India Exchange of Scientist Program with visits to Indian Statistical Institute, Indian Institute of Agricultural Research Statistics and Indian Institute of Technology, Bombay, March, 1980.

(vi) J. S. Rustagi assumed the Managing Editorship of Annals of Statistics and Annals of Probability on January 1, 1981 and is a member of the Council of Institute of Mathematical Statistics.

5. Research Personnel on the Project

- (i) Mr. Nick Teoh, July, August, 80
- (ii) Ms. Mona Yousry, July, August, 80
- (iii) Ms. Svetlana Dynin, January 1-July 31, 81
- (iv) Prof. L. M. Berliner, August, 81.